What is claimed is:

CLAIMS

1. A receiver front end for use in a communications system that employs digitally modulated signals operating in a band of frequencies that is divided into two or more non-overlapping channels, with each channel occupying no more than a predetermined maximum frequency band, the front end comprising;
   a down-converter configured to accept a data stream data stream comprising samples of the entire band sampled at a rate of at least twice the frequency of the highest frequency in the band and to convert the component channel signals within the band to baseband; and
   a decimator configured to decimate a down-converted signal received from the down-converter.

2. The receiver front end of claim 1 further comprising a plurality of down-converters configured to down convert to baseband the component channels within the band in parallel.

3. The receiver front end of claim 2 further comprising a decimator configured to receive the baseband channel signals from a corresponding one of the down-converters and to decimate the corresponding baseband channel signal to a digital data stream having two samples for each symbol period of the respective channel.

4. The receiver front end of claim 3 wherein the communications system is a DOCSIS compatible communications system.

5. The receiver front end of claim 4 wherein the front end is configured to down-convert and decimate a DOCSIS data stream comprising digitally modulated signals that fall

within non-overlapping upstream channels that are assigned within a 5 to 42 MHz band.

6. The receiver front end of claim 5 wherein the front end is configured to down-convert and decimate a data stream in which non-overlapping channels are assigned bandwidths of approximately 3.2MHz, 1.6 MHz, .8 MHz, .4 MHz, or .2 MHz.

7. The receiver front end of claim 1 further comprising a plurality of down-converters arranged in a tree-structure to iteratively convert to baseband successively smaller portions of the frequency band.

8. The receiver front end of claim 7 wherein the down-converters are configured to iteratively convert to baseband smaller portions of the frequency band until each channel within the band is converted to baseband.

9. The receiver front end of claim 8 further comprising decimators configured to decimate the successively smaller portions of the frequency band.

10. The receiver front end of claim 9 wherein the decimators are configured to decimate each baseband channel to a sample rate that is twice the symbol rate of the baseband channel.

11. The receiver front end of claim 1 further comprising an analog to digital converter (ADC) configured to receive the full-band analog signal, to sample the entire band at greater than twice highest frequency of the band and to provide the sampled data to the down-converter.

12. A method for down-converting and decimating digitally modulated signals operating in a band that is divided into two or more non-overlapping, with each channel occupying

no more than a predetermined maximum frequency band, the method comprising the steps of;

(A) a down-converter accepting a data stream comprising samples of the entire band sampled at a rate of at least twice the frequency of the highest frequency in the band;

(B) the down-converter converting the component channel signals within the band to baseband; and

(C) a decimator decimating the down-converted signal received from the down-converter.

13. The method of claim 12 wherein the step (B) of down-converting further comprises the step of:

(B1) a plurality of down-converters down-converting to baseband the component channels within the band in parallel.

14. The method of claim 12 wherein the step (C) of decimating further comprising the step of:

(C1) a decimator receiving the baseband channel signal from a corresponding one of the down-converters decimating the corresponding baseband channel signal to a digital data stream having two samples for each symbol period of the respective channel.

15. The method of claim 12 wherein the down-converter and decimator down-convert and decimate DOCSIS compatible signals.

16. The method of claim 15 wherein the down-converter and decimator down-convert and decimate a DOCSIS data stream comprising digitally modulated signals that fall within non-overlapping upstream channels that are assigned within a 5 to 42 MHz band.

17. The receiver front end of claim 16 wherein the down-converter and decimator down-convert and decimate a data stream in which non-overlapping channels are assigned bandwidths of approximately 3.2MHz, 1.6 MHz, .8 MHz, .4 MHz, or .2 MHz.

18. The method of claim 12 wherein the step (B) of down-converting further comprises the step of:

(B2) a plurality of down-converters arranged in a tree-structure iteratively converting to baseband successively smaller portions of the frequency band.

19. The method of claim 18 wherein the step (B2) further comprises the step of:

(B3) the down-converters iteratively converting to baseband smaller portions of the frequency band until each channel within the band is converted to baseband.

20. The method of claim 12 further comprising the step of:

(C2) decimators decimating successively smaller portions of the frequency band.

21. The method of claim 20 further comprising the step of:

(C3) the decimators decimating each baseband channel to a sample rate that is twice the symbol rate of the baseband channel.

22. The method of claim 12 further comprising the step of:

(D) one or more analog to digital converters (ADC) receiving the full-band analog signal, the number of ADCs being fewer than the number of channels in the band,

(E) the ADCs sampling the entire band at greater than twice highest frequency of the band; and

(F) the one or more ADCs providing the sampled data to the down-converters and decimators.